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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



SEPTEMBER 8, 1934

Palisades of the Moon?

See Page 148

A

SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVI

No. 700

The Weekly  Current
Summary of Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian and Foreign subscribers please add \$1 a year to regular subscription rates to cover postage. In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Advertising rates furnished on application.

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Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., *Editorial and Executive Office*, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserv, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

Eighty-nine breeds of dogs are recognized by fanciers.

There are 800 species of flowering plants in Glacier National Park.

Dried apricots, raw or cooked, are found to be a good source of vitamins A and C, particularly the former.

The Great Serpent Mound in Ohio, constructed by Indians long ago, is a winding effigy of earth 1,400 feet long.

The brown trout's habit of taking refuge under stones and in crevices when disturbed makes it easy prey for snapping turtles.

Hybrid chickens that grow faster and are ready for market earlier than pure bred fowl are being tried out by government scientists.

Human beings are more fortunate than hatchery fish when it comes to being treated for sickness: men can be treated as individuals, but fish have to be dosed wholesale, the well with the sick.

An African elephant's ears may be as large as five by three feet.

Argentina is achieving promising results with experiments in raising tung trees, sources of the useful tung oil.

Florida hurricanes do one piece of constructive work, in that they destroy appreciable quantities of pests that attack citrus trees.

Keeping hatchery fish healthy is a problem for fish culturists, and one epidemic last year killed three million Loch Leven trout, potentially worth \$25,000.

Radio is making Americans "speech conscious" and improving our way of speaking, says Miss A. O. Hunnewell, instructor in English at the University of California.

A government survey of real property shows that in one typical city 35 per cent. of the homes are in good condition, 44 per cent. need minor repairs, 18 per cent. need structural repairs, and the rest are unfit for habitation.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

What weapons did the earliest American hunters use? p. 147. *Ancient Americans*—Emily C. Davis—Holt, 1931, \$3.50.

Who once lived on Kodiak island? p. 152.

Why was Farmer Olof Christofferson knighted? p. 153.

ASTRONOMY

What made the cracks on the moon? p. 148.

CHEMISTRY

Of what does Dakin's solution consist? p. 153.

What two things come out of fire? p. 158.

GEOGRAPHY

Of what use are geographers? p. 151. *The New World: Problems in Political Geography*—Isaiah Bowman—World Book Co., 1930, \$3.

MEDICINE

Can a mother cause cancer in herself? p. 152.

Can drugs be soaked in through the skin? p. 156.

METEOROLOGY

Where do hurricanes usually come from? p. 150. *Why the Weather*—Charles F. Brooks—Harcourt, Brace, 1924, \$2.

Are deserts thrifty of rain when it falls? p. 152.

MILITARY SCIENCE

What kinds of targets are most liable to attack by airplane? p. 154. *What Would Be the Character of a New War?*—Sir Norman Angell and others—Smith and Haas, 1933, \$2.50.

PHYSICS

How much current is produced by a lightning stroke? p. 157.

Is a non-magnetic hairspring useful in a watch? p. 152.

PHYSIOLOGY

Is life possible without glomeruli? p. 153.

PSYCHOLOGY

Can you spell well if you read fast? p. 152.

Why do cultured people tolerate "tough" films? p. 156.

PUBLIC HEALTH

How can the spread of diabetes be checked? p. 158.

PUBLIC SAFETY

What should be done with a drunken driver? p. 153.

RADIO-METEOROLOGY

How can radio aid in "spotting" hurricanes? p. 151.

SEISMOLOGY

What improvements have recently been made in earthquake-detecting instruments? p. 157.

VETERINARY MEDICINE

Is raw meat good for dogs? p. 152.

These curiosity-arousing questions show as a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

ARCHAEOLOGY

Bones and Dart Points Date American 12,000 Years Old

Six "Folsom" Points Found Among Skeleton Remains In Minnesota Gravel Pit Proof of an Ancient Race

FROM a gravel pit near Fertile, Minn., have been picked pieces of human bones mingled with six of the finely-fashioned dart points, skillfully chipped from flint, called "Folsom and Yuma points."

These Folsom and Yuma points are America's most intriguing relics made by human hands. For in New Mexico, Colorado, Oklahoma and other States these dart points were found associated with the remains of animals that scientists are confident have been extinct in North America for at least 10,000 or 12,000 years, a period of time that takes their antiquity back far beyond the Indian tribes Columbus found on his arrival.

Now Prof. A. E. Jenks of the University of Minnesota reports in the journal, *Science*, his evidence that these pieces of man-fashioned flint have been found unmistakably buried with a human being.

Outstanding Mystery Solved

Here is the solution of what is generally conceded to be an outstanding mystery in American prehistory. The discovery for which Minnesota now claims credit has been sought in almost every state in the Union. In almost two-thirds of the States have been found the sharp stone points for tipping wooden spears, made after the prehistoric trade-marks that modern science calls Folsom and Yuma in honor of the places where such stone work was first identified. The stone points resemble arrow tips but they are thousands of years older than the invention of bows and arrows in this country. The darts could be found, and with them bones of mammoths, extinct species of bison and other game belonging to the last days of the Ice Age. But where were the hunters? So long as the hunters themselves were missing, some anthropologists withheld judgment cautiously as to whether there were actually in America human beings as long ago as the age of the mammoths.

The ancient American from Minnesota, probably unimportant during his life and now suddenly thrust into the scientific limelight, has already been named. He will go into scientific history as "Brown's Valley Man" after the modern name for his burial place.

Amateur's Quick Intelligence

Full credit for the first stages of the discovery is given by Dr. Jenks to William H. Jensen of Brown's Valley: "To his quick intelligence the rescue and conservation of the find is due."

It was last October that Mr. Jensen happened to spy a symmetrical bit of flint in some gravel dumped on his driveway for road repair work. Being a collector of Indian antiquities, Mr. Jensen recognized it as a hand-shaped stone weapon. Fragments of human bone also caught his eye in the gravel. He hastened to the pit where the drayman was getting his road material and there he discovered portions of skull and other bones of a human burial, in the bottom of the seven-foot pit dug by the energetic drayman. Five weapon points of the type used by the oldest hunters known in America were picked out or dug out of the gravel of the ancient grave.

Mr. Jensen felt that he had something remarkable and interesting, and three months later—this discovery drama moved slowly—he wrote to Dr. Jenks about it. In June the drama rose toward its climax when he sent Dr. Jenks a photograph and the University anthropologist recognized to his surprise that the gravel pit grave had held a hunter who used the famous Folsom type of stone weapon.

Re-Dug the Pit

Late in July Dr. Jenks and six archaeology students arrived at Brown's Valley and confirmed their privately received report by re-digging the drayman's gravel pit. They brought up 17 more bones of the badly shattered skeleton, and could fit some of the pieces to bones found earlier by Mr. Jensen.

They also dug out a sixth flint weapon of ancient pattern.

To get the verdict of a geologist as to the age of the gravel deposit, Dr. Jenks has queried the dean of specialists on American glaciation, Dr. Frank Leverett. Dr. Leverett dates the gravel when Lake Agassiz spread over this as belonging to the Ice Age period, section of the country, and, more particularly, he believes the gravel was deposited near the beginning of the Tintah stage of the glacial lake, or about 12,000 years ago.

No Loam in Pit

Since the burial pit contained no trace of the black loam blanket, which has long covered the layer, Dr. Jenks is convinced that the hunter was buried there in America's Ice Age.

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PROVES AMERICAN'S ANTIQUITY

This bit of finely chipped flint found with the skeleton of the prehistoric primitive American hunter who probably used it, pushes man's antiquity in America back to some 12,000 years ago, when mammoths and mastodons, now extinct, lived on this continent. It was found in Brown's Valley, Minnesota, by Dr. Albert E. Jenks, University of Minnesota.

ASTRONOMY

Clefts or "Canals" Are Now Discovered on the Moon

See Front Cover

"DITCHLIKE," straight line depressions on the surface of the moon are exciting the interest of astronomers. "Canals," some observers have been tempted to call them, by analogy with the famous and oft-disputed markings on the planet Mars.

The *Journal of the British Astronomical Association* has brought some newly recorded markings on the moon to the attention of European scientists through the publication of drawings by L. F. Ball, fellow of the Royal Astronomical Society. Mr. Ball has made the drawings available to America through Science Service. One of them is shown on the cover of this week's SCIENCE NEWS LETTER.

Some of the moon "ditches" are so straight and regular that uninformed observers might believe they were dug by the hands of a lost race of moon-men. Astronomers call the regular markings "clefts."

In the region of Weigel four great moon craters are shown, illuminated just at what would be sunset on the earth, when the sun is low on the moon's horizon and the shadows are long. Into two of the craters runs the ditchlike cleft with the forked end.

The origin of the clefts discovered on the moon is a matter of conjecture. Astronomers place no faith in any belief that they are the work of "moon-men."

One theory says that the clefts are geological faults in the moon's surface, that is, a place where the land suddenly sank or rose to form a cliff like the Palisades of the Hudson River.

Many of the clefts on the moon, which have been referred to as ditchlike depressions because of their appearance, are really towering cliffs. The black, dark area that looks like a ditch is the shadow of the cliff on the neighboring moon countryside.

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PUBLIC HEALTH

Public Health Leader Urges Teaching of Birth Control

MARRIAGE advice bureaus operated by public health departments to give advice on all problems of health in marriage, including the teaching of birth control, were advocated by Prof. Haven Emerson of Columbia University in his presidential address at the meeting of the American Public Health Association.

"Let us teach for the sake of women the knowledge which will permit them to choose the time and circumstance of their own childbearing," Prof. Emerson declared.

"Whatever may be one's intuitive, traditional, social, religious or medical preference in the use of contraceptive information as a proper application of knowledge for the protection and integrity of the family and to reduce the evidence of inherited and congenital disease and defect, the almost universal

familiarity with half-truths on this subject and the evident effect of their wide application in the falling birthrate makes it incumbent on physicians and health officers to familiarize themselves with organized efforts in this direction at home and abroad."

Prof. Emerson sees the marriage advice station as a suitable outgrowth of the prenatal clinics and child welfare stations at present conducted by health departments and private health agencies. Rather than let these marriage advice centers grow in a disorderly, amateur and more or less irresponsible way, as is the present tendency, he urged their development through such channels as health departments and hospitals.

Health officers should confer with medical schools, hospitals, outpatient and social agencies of their communities in order to develop such centers with-

HARNESSING SCIENTIFIC DISCOVERIES

an address by

Dr. P. G. Agnew

Secretary of the American Standards Association

Wednesday, Sept. 12, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

out offense to church or other social groups which may still hesitate to lend their influence or approval to this movement.

"Both mental hygiene and social hygiene should benefit by the official inclusion of a marriage advice service under the health department or in connection with the outpatient service of a general hospital," he said.

The clientele of these stations falls into the groups of those planning marriages, of those seeking advice on premarital problems, on uncertainties and difficulties related to childbearing in marriage and on sex and other problems in and out of wedlock. These stations can be of great service in preventing venereal disease and pelvic cancer as well as in giving competent professional education in birth control, he pointed out.

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SEISMOLOGY

Baffin Bay Region Shaken by Quake

THE REGION of Baffin Bay was shaken by a strong earthquake that occurred three minutes after midnight on Friday, Aug. 31, and recorded itself on American seismographs. The location was determined by the U. S. Coast and Geodetic Survey from reports wired Science Service by seismological observatories at Ottawa, Ann Arbor, Tucson, Ariz., Pasadena and Berkeley, Calif., St. Louis, Mo., Chicago, and Washington, D. C. This quake was in the same region as one that occurred last fall.

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Roman and Semitic noses are believed to have appeared late in racial evolution in southwest Asia.

PHYSICS—PHILOSOPHY

"Nature Consists of Waves Of Knowledge in Minds"

Sir James Jeans in B.A.A.S. Presidential Address Presents Philosophical Meanings of New Physics

"NATURE consists of the general quality of waves of knowledge, or of the absence of knowledge, in our own minds."

Sir James H. Jeans, noted mathematical physicist, using these words has condensed reality, the very existence of human beings, and all other manifestations of the world we sense, into happenings in our brains. Thus the "universe around us" becomes mental.

In his presidential address opening the annual British Association for the Advancement of Science at Aberdeen, he presented striking philosophical interpretations of the new physics.

As to whether the universe is so predestined and planned that individual free-will and initiative is ineffective, Sir James finds that the new physics of today is far more hopeful than the classical physics of a generation ago that gave rise to materialism.

"Can our minds change what is happening in reality, or can they only make it look different to us by changing our angle of vision?" Sir James asked. "We do not know, and as I do not see how we can ever find out, my own opinion is that the problem of free-will will continue to provide material for fruitless discussion until the end of eternity."

Reopened a Door

"The contribution of the new physics to this problem is not that it has given a decision on a long-debated question, but that it has reopened a door which the old physics had seemed to slam and bolt. We have an intuitive belief that we can choose our lunch from the menu or abstain from housebreaking or murder; and that by our own volition we can develop our freedom to choose. We may, of course, be wrong. The old physics seemed to tell us that we were, and that our imagined freedom was all an illusion; the new physics tells us it may not be."

Although Sir James did not use the word "God," he referred to what many might call God, "the problem which

would have commended itself to many philosophers, from Plato to Berkeley."

This question arose in his address in connection with his detailed illuminating contrasts of the old particle-picture of the universe of classical physics and the newer and more accurate wave-picture of the new physics.

"The old particle-picture which lay within the limits of space and time, broke matter up into a crowd of distinct particles, and radiation into a shower of distinct photons," he explained. "The newer and more accurate wave-picture, which transcends the frame-work of space and time, recombines the photons into a single beam of light, and the shower of parallel-moving electrons into a continuous electric current."

Division Disappears

"Atomicity and division into individual existences are fundamental in the restricted space-time picture, but disappears in the wider, and as far as we know more truthful, picture which transcends space and time. The photons are no longer distinct individuals each going its own way, but members of a single organization or whole—a beam of light. The same is true of the electrons of a parallel-moving showed."

"The biologists are beginning to tell us, although not very unanimously that the same may be true of the cells of our bodies. And it is not conceivable that what is true of the objects perceived may be true also of the perceiving minds? When we view ourselves in space and time we are quite obviously distinct individuals; when we pass beyond space and time we may perhaps form ingredients of a continuous stream of life."

From this idea of each of us as an indistinct part of the universal life stream, Sir James considers it but a step to the solution of the greater problem which lies at the foundation of religion and mysticism.

In this manner physics, as viewed by Sir James, provides "a possible although very conjectural clue" to why in a na-

ture made of our mental ideas our many minds all construct one and the same nature and we all see the same sun, moon and stars.

How Bohr, Einstein, Heisenberg, de Broglie and Schrödinger developed so successfully a universe of waves instead of particles, as in the classical physics, was recounted by Sir James. He finds the wave picture or analogy much more satisfactory, saying:

Just Storminess

"The universe is no longer a deluge of shot from a battery of machine-guns, but a stormy sea with the sea taken away and only the abstract quality of storminess left—or the grin of the Cheshire cat if we can think of a grin as undulatory."

Space and time can not be classified as realities of nature but are mere mental frameworks of our own construction, Sir James said. In the new wave-picture of modern physics, ordinary time and space are inadequate to show two currents of electricity moving independently. Six dimensions of space and one of time are necessary.

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FOUND 12,000-YEAR-OLD AMERICAN

Dr. Albert E. Jenks, University of Minnesota anthropologist, who has just announced "Brown's Valley Man," one of the oldest of authenticated Americans. Over a score of pieces of human skeleton were dug out of a Minnesota gravel pit by Dr. Jenks and William H. Jensen, amateur collector of Indian relics, who was the discoverer. In the photograph Dr. Jenks is examining an African skull, and not his most recent find. (See page 147.)

METEOROLOGY

Erratic Gulf Hurricane "Licked" by Land Wind

Gulf-Born Storm Forced to Double on Its Tracks;
Inland Weather Favors Fall Agricultural Work

"SCREWY," though slang, is nevertheless an accurate characterization of the conduct of the Gulf hurricane that threatened the Gulf ports of Texas during the last week in August, and then put out to sea again, bound no one knew whither. Its course could almost be charted with a corkscrew.

It was not in any respect a typical autumnal tropical storm in its coming, and in its howling retreat over the thrashed-up waters of the Gulf it was just as atypical. C. L. Mitchell of the U. S. Weather Bureau told Science Service. It was driven back, "licked," by a high-altitude land wind from the north.

It was not a large storm, as hurricanes go, but what there was of it was pretty intense. When it approached Galveston, meteorologists expected it to go on ashore, wreak what damage its strength enabled, and then blow itself out over the wide plains of Texas. That is the ordinary, or "orthodox" thing for a hurricane to do. People on the Gulf coast, warned of its coming, made things as secure as possible and then got out of the way.

Instead of striking as expected, however, it veered back toward the east, whence it had come, and when last heard of it was still doing its dervish dance out over the Gulf, some 280 miles to the south of the Mississippi delta.

Meteorologists were as baffled as laymen over this abnormal behavior, until reports of pilot balloons launched at inland points in the South and West began to come in. These showed that a strong wind at high altitudes had steadily pressed against the westwardly drifting storm from the Gulf, amounting in effect to a counter-attack which it could not overcome or pierce, so that in the end there was nothing to do but retreat.

This saving high-level north wind was born of a great, persistent area of high pressure, that moved in with the recent cool wave from the Northwest and had much to do with the beneficial

rains that have fallen in the Midwest and Southwest. The "high" constituted a citadel of even, steady weather which the violent but small off-shore storm could not penetrate, and from which the land-wind sortie issued to drive it back.

In its birth no less than in its behavior, the storm was atypical, Mr. Mitchell said. The usual autumnal hurricane comes into being somewhere out over the South Atlantic, drives up through the Caribbean, and makes its landfall somewhere in the West Indies, on the South Atlantic coast of the United States, or on the Gulf coast of this country or Mexico.

Not so the present storm. It apparently originated right in the Gulf of Mexico itself, for its presence was first reported somewhere to the southward of the Mississippi delta. Thence it fol-

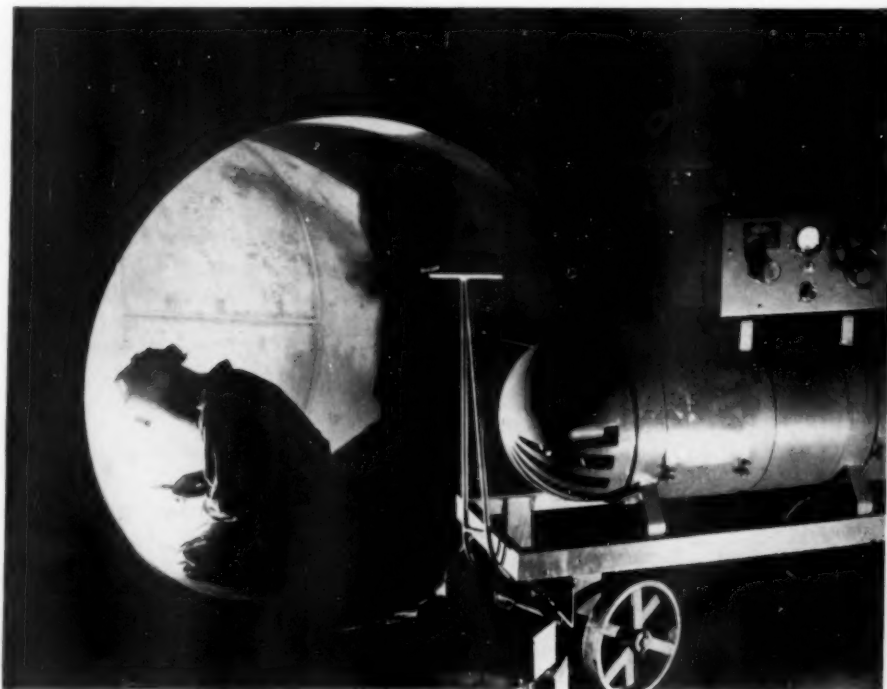
lowed its erratic course, first toward the west, then back again in an easterly direction.

This has been a freak season for marine storms anyway, Mr. Mitchell commented. There have been three so far, one in June and two in August, none of them of tropical Atlantic origin. The other August one originated off the Carolina coast and wound up on the shores of Texas.

Two August "tropicals" striking Texas in itself constitutes a record, Mr. Mitchell reported. In 48 years of record, only half-a-dozen hurricanes have struck the Texas coast during the month of August. Never before, so far as can be determined, have the weather-gods bestowed upon it such a double doubtful favor.

Farmers over a wide area in the Ohio valley and the southern part of the Midwestern corn belt are now energetically pushing ahead with their fall plowing program, taking advantage of the thorough wetting down which the soil received from early autumn general rains. In Iowa, Minnesota and northwestern Wisconsin, other farmers followed their example, as the skies cleared after a second rain area that swept across the grain area on Aug. 28 and 29.

At the same time, they received encouragement from the fact that the cool



MODERN VULCAN

The fantastic figure performing the rite at the left is welding 315,000 pounds of stainless clad steel into the huge pipe, part of which is shown. When completed, the pipe will carry air under pressure. It is being built by the Cream City Boiler Company of Milwaukee, Wisconsin.

wave, that even brought light frosts in the northern parts of the corn belt, passed without bringing temperatures low enough to do material harm to the corn, which only a couple of weeks previously had been fighting for its life against hundred-degree midday heats, with dwindling soil moisture to draw on. Corn over practically the whole of the major crop areas is now safe from frost, J. B. Kincer, crop weather specialist of the U. S. Weather Bureau, stated.

The Midwest is not the only section that has been favored with saving rains, Mr. Kincer stated. Over the Southwest the rain-clouds moved, materially easing the situation, especially as it affected the cotton crop of northwest Texas and the late pastures everywhere. Failing supplies of drinking water for the stock were replenished, at least in part, and a small beginning was made in reducing the exceedingly serious moisture deficit in the soil.

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Rubbing mild soap, moistened, on mosquito bites is a simple remedy for the itching they cause.

RADIO—METEOROLOGY

Static From Hurricanes May Aid in Locating Them

IN TENSE radio static caused by ocean hurricanes as they sweep across southern waters may be used to locate these storms and chart their progress.

The University of Puerto Rico, working in collaboration with the University of Florida, proposes to undertake a research program on the location of hurricanes by the radio static they produce. The work will be under the direction of Dr. G. W. Kenrick, who is joining the University staff this year as visiting Professor of Physics. Dr. Kenrick is on leave from Tufts College, Medford, Mass.

Ample evidence exists, Dr. Kenrick declares, supporting the theory that hurricanes send out static which may be used to locate their position just as radio signals from an ocean liner may be used to locate its position by means of a radio direction finder.

Static from a hurricane, however, is only intermittent and can be easily confused with static arising elsewhere, Dr.

GEOGRAPHY

Geographers' Aid Needed In Readjusting World Relations

GEOGRAPHERS are still needed in the world, even though maps now show few "blank places." Many of the mountains, river courses and other features now confidently displayed on published maps have to be shifted and rearranged when explorers and survey parties come out with new data; and even of greater importance, men with really scientific knowledge of lands, their resources and their peoples are needed for the just rectification of boundaries and the establishment of commercial arrangements that can be expected to remain stable.

Ideas bearing on these points were laid before the meeting of the International Geographical Congress at Warsaw by its president, the well-known American geographer, Dr. Isaiah Bowman. Dr. Bowman is president of the

American Geographical Society, secretary of the National Research Council, and secretary of President Roosevelt's Science Advisory Board.

"Until expert knowledge of existing realities is available," Dr. Bowman said, "we shall not find those sought-for understandings of the world's peoples that are required to ease existing tensions. A rational change in relationships will not come by capricious action or through ignorance or provincialism. If we really understand how and why humanity is compartmented in its several regions we shall find adjustments less difficult to make even though we are at times oppressed by the complexities."

"The earth is a vast reservoir out of which man dips power. There is unequal access to that reservoir: the earth's benefits are unevenly distributed, and, in addition, as Prof. Penck has phrased it, 'There is no land of unlimited resources.'

"This is due in part to what we call the geographical layout. In part also it is due to the voltage of man's own mind, ever changing the significance of a given environment, searching out new advantages, developing new technical skills, seeking balance or proportion in community, regional and national life, extending the boundaries of knowledge and adapting the earth and humanity to satisfy material and aesthetic needs."

Uneven Distribution

"To take an example from a single field," Dr. Bowman continued: "Not always are desirable mineral deposits accessible—witness the geographical disposition of the coal beds of China; nor are they always required at the moment—witness the vast iron-ore deposits of Brazil."

"We have begun, but in no sense finished, our regional inventories of fact about the resources of the earth, the uses which we may make of them, the mutual adaptations. Nor has anyone yet been able to draw a clear line of distinction between matters under domestic control and those which can never be used rationally and fairly except through international consultation and agreement."

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ARCHAEOLOGY

Explores "Stepping Stone" Of Earliest Migrations

DISCOVERY of two decorated lamps and a quantity of skeletal remains is reported to the Smithsonian Institution from its expedition now excavating Kodiak Island, one of the important "stepping stones" of Alaska where some of the earliest immigrants of America are believed to have tarried.

Importance of Kodiak in American prehistory was called to scientific notice four years ago, when Dr. Ales Hrdlicka of the Smithsonian staff found evidence that the island was inhabited successively by peoples of varying cultures over a long period.

With five students, Dr. Hrdlicka is pushing excavations, hoping to accumulate enough buried evidence this season to show definitely what Kodiak Island meant in the oldest "colonizing" of North America.

By systematically collecting bird and animal bones from the buried layers of habitation, the expedition is learning what the ancient peoples ate, and what forms of wild life were important to them.

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MEDICINE

Failing to Nurse Children May Cause Breast Cancer

CANCER of the breast is the penalty women pay for failing to bear and particularly to nurse children, in the opinion of Dr. Emil Bogen of Olive View, Calif. Evidence for this theory, based on statistics and on animal experiments, was presented by Dr. Bogen at the meeting of the American Public Health Association.

Comparison of birthrates and of cancer deathrates show that where the birthrate is low, the deathrate from breast cancer is high. Furthermore, in urban localities, northern countries and regions where small families and early weaning of the babies are customary the deathrate from breast cancer is high. It also appears to be higher among unmarried women and married women who have not had children than among mothers of large families.

From experiments with white mice, Dr. Bogen finds an explanation for this. A derivative of the chemical substance, cholesterol, is capable of producing cancer just as some of the coal

tars do when painted on the skin, he pointed out. This same substance, cholesterol, is present in the ducts of the female breast, both when it is producing milk and when it is not. In the absence of the normal drainage that comes with milk production and child nursing, this cholesterol may undergo the chemical changes that make it develop cancer-producing qualities, in Dr. Bogen's opinion.

Childbearing and nursing is accordingly a natural preventive measure against this cancer-producing agent present in the body.

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VETERINARY MEDICINE

Raw Meat Recommended For Proper Dog Diet

DOG DIETS must contain a proportion of fresh raw flesh, Dr. R. G. Linton of Edinburgh's Royal Veterinary College contends.

"The dog is still a carnivorous animal," Dr. Linton declared. "Fresh raw flesh is definitely essential for young growing dogs, and raw liver, spleen, and kidney are particularly valuable in this respect."

Crushed bones or bone flour should always be given to mother dogs and also to puppies. Fresh horse flesh, if obtained from grass-fed animals, is quite as good for dog food as ox beef, Dr. Linton said.

Because the chemical composition of dog biscuits varies according to the kinds, it is necessary to know their composition in order to feed a standard ration. Research has shown that dogs can get along without vitamin C, but their diet should contain an abundance of the other vitamins.

Science News Letter, September 8, 1934

PSYCHOLOGY

Much Reading Produces Improvement in Spelling

IF YOU WANT to improve your spelling, read more. Tests made by Dr. Luther C. Gilbert of the University of California department of education show that high school and college students tend to become better spellers through their reading. And you do not need to read slowly. In fact in one test fast readers made more improvement than slow readers.

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IN SCIENCE

METEOROLOGY

Deserts Waste Most Of Rain They Receive

DESERTS, which need water more than any other lands, are apparently most wasteful of such rainfall as they do get. Studies indicating this have been made by Dr. Forrest Shreve of the Desert Laboratory of the Carnegie Institution of Washington, located at Tucson, Ariz.

Desert soils lose approximately half of their annual precipitation income through run-off and evaporation, Dr. Shreve has learned. During the brief and heavy summer rains as much as seventy per cent. of the water runs off the soil immediately.

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PHYSICS

Father Time Unhampered By Magnetic Attractions

NEW WATCHES, not affected by the small forces of magnetism occurring nearly everywhere, are made more accurate with the use of non-magnetic hairsprings and balance wheels.

Ordinary watches, no matter how expensive and carefully made, all have characteristics which make them fall out of step with the steady pace of time.

A new type of watch studied by R. E. Gould of the National Bureau of Standards has its critical parts, hairspring and balance wheel, fabricated of non-magnetic metal. "Elinvar," a nickel-steel alloy, is used for the hairspring because it does not become sluggish after being exposed to small electric currents.

The use of elinvar further simplifies the construction of a watch because it also automatically compensates the effects of heat and cold and eliminates the intricate construction normally necessary to prevent changes in size of the balance wheel with temperature.

In carefully conducted tests covering nearly all conditions forty different watches were compared. Those with non-magnetic hairsprings were proven more accurate.

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SCIENCE FIELDS

ARCHAEOLOGY

Peasant Archaeologist Knighted at Seventy

FOR A LONG lifetime of devotion to the study of Swedish antiquities, a Swedish farmer, Olof Christoffersson, has been created a Knight of the Royal Order of Vasa.

Mr. Christoffersson, now 70 years old, still recalls studying his first archaeological book as a boy. Treasured specimens, found in the fields of his province Scania, were often thrown away as rubbish by his mother in those days.

Since then, from his farmhouse collection, he has made numerous priceless gifts to the historical museums in Stockholm, Lund, and Trelleborg, and has gained fame among archaeologists of Sweden for his unusual knowledge of Scania's ancient history.

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PUBLIC SAFETY

Drunken Driver Accidents Increased 60 Per Cent

TRAFFIC accidents attributable to drunkenness or drinking on the part of the driver increased over 61 per cent. in the last year, Capt. H. L. Barlow of the Los Angeles Police Department told members of the American Public Health Association.

Pedestrian cases in the same class increased 53 per cent.

These figures are for accidents in Los Angeles, where the amount of traffic is much heavier than in other cities of the same size, partly because the ideal climatic conditions make driving possible all year around and partly because of the large number of motoring tourists who complicate the situation by their ignorance of traffic regulations.

"Drunkenness, selfishness, ignorance, carelessness and lack of judgment are responsible for a large majority of traffic fatalities," Capt. Barlow declared. "Drunken drivers should be subjected to more severe criticism and it has been urged that in dealing with this type of offender there should be a suspension or revocation of the operator's license."

In Los Angeles the District Attorney has agreed to accept the testimony of two experienced police officers in preference to the testimony of a physician in cases where alcohol enters into auto accidents. This has eliminated failure to convict in certain instances where there has been more or less delay in getting the subject before a physician for a sobriety test, Capt. Barlow explained.

Chief causes of accidents where the driver was responsible were failing to observe traffic, exceeding speed limit and drunkenness. In the accidents in which pedestrians were responsible, the chief causes were failing to observe traffic, crossing at intersections against signals and crossing between intersections, Capt. Barlow's figures showed.

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CHEMISTRY

Dakin's Solution Now Produced Electrically

DAKIN'S solution, war-time antiseptic for treating infected wounds, may now be easily and satisfactorily made by an electrolytic cell. The apparatus was designed by Dr. O. R. Sweeney of Iowa State College at Ames, and has been developed for practical use in hospitals by Paul A. Frank of Akron, Ohio.

Dakin's solution, invented by Drs. H. D. Dakin and M. Daufresne during the early days of the World War, is a solution of sodium hypochlorite. Since the War its use in civilian hospitals has been limited by its poor keeping qualities and the fact that it requires considerable skill in its preparation. If it is not strong enough it will not destroy the microorganisms in the wound, and if too strong it will injure the tissues of the body. The differences between too strong and not strong enough is very small.

To overcome the technical difficulties in preparing this solution, Dr. Sweeney designed a simple, practically foolproof apparatus which is now called the antiseptic cell. An electric current controls the chemical reaction so that the resulting solution is of just the right strength. The hospital technician has only to put into the apparatus a measured amount of sodium chloride, distilled water and sodium bicarbonate, and turn on a switch. Fresh hypochlorite solution is then automatically produced at the rate of about an ounce a minute.

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PHYSIOLOGY

Studies on Fish Add To Knowledge of Kidney

BETTER understanding of the complex structure and functioning of the human kidney which may lead to more successful treatment of kidney diseases has been gained from study of this organ in the toadfish, according to a report of Dr. E. K. Marshall, professor of pharmacology at the Johns Hopkins Medical School.

The human kidney, Dr. Marshall explained, is a gland made up of about a million small units consisting anatomically of distinctly different structures. Two of these are especially different. One of them, called the glomerulus, is a tuft of blood vessels coiled around in a hollow sphere of cells. Another is a hollow tube called the tubule.

In order to understand how the kidney forms the fluid which carries away part of the waste products of the body, physiologists have realized for a hundred years that they must discover what part is played by the glomerulus and what part by the tubule.

The opportunity to make this discovery came when Dr. Marshall found that the toadfish has a kidney in which there are no glomeruli. Information gained from a study of this animal can not be transferred absolutely to the human kidney, but many of the findings do apply to man and other vertebrate animals, Dr. Marshall pointed out.

The kidney that has no glomerulus can not excrete sugar, he found. It does excrete, to some extent at least, practically all diffusible foreign bodies which may be introduced into the fish or other animal. It does not excrete protein.

The tubule secretes substances, Dr. Marshall stated. While the tubule of the kidney in man and other mammals may not have this power to as high a degree as the kidney of the toadfish, it probably has it to some extent.

The importance of this lies in the possibility that when the glomeruli of the kidney are injured by disease, the tubules may be able to take over some of the functions of the glomeruli. Recent investigations by Prof. William deB. MacNider of the University of North Carolina indicate that this may be what actually happens in cases of kidney disease, Dr. Marshall pointed out.

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Mars: City Planner

Cities, Once Compacted Together for Strength, Must Now Scatter for Safety, if War Continues to Haunt the World

By DR. FRANK THONE

RUMORS of war thicken and grow more ominous day by day. Governments move to strengthen alliances, build impregnable steel-and-concrete fortification systems along their frontiers, amass piles of munitions and supplies, and organize the factories in their cities for the rapid production of still more.

But those cities! What shall be done about them? Once the strength of a nation at war, they are now its weakness. Until a few years ago, if you could only keep an army between your enemy and your urban centers of production and industry, the cities would feed and supply your army, and you were safe.

Now, however, the airplane has spoiled all that. Your enemy can fly over your head and strike at the cities in your rear, or at the transport lines between, leaving your army hungry and its guns without powder and shot. The nakedness of our cities, their lack of an effective shield overhead, is the outstanding worry of staff strategists nowadays, especially in Europe, where there are dozens of nationalities with conflicting ambitions and desires crowded into the smallest of the continents, and where even near-bankrupt governments have their fleets of bombers.

Study Types of Protection

How shall our cities be protected against air attack?

To answer that question we must know what the objectives of such attack may be. Generally speaking, air attack on the fighting front is aimed at one of two things: either to destroy matériel—artillery, truck trains, supply and ammunition dumps, etc.—or to kill or disable the soldiers themselves. Similarly, we may expect planes attacking cities to aim either at ruining factories, railway terminals, government buildings and other valuable concentrated targets, or else at human targets, to kill or demoralize the workers.

Many are the schemes proposed for armoring the roofs of important buildings against explosives, for making their

walls fireproof against incendiaries, gas-tight against chemical fumes. One Italian engineer would have us build cities like battleships, with direct frontal resistance to all blows that might be struck. He would have all tall buildings, crowned with thick cupolas or domes; at least the lower floors windowless, to foil splinters and infiltrating gas; projecting high above any possible gas levels tall ventilator pipes. Such a city would look very much like a colony of the enormous termite hills that stand on the South African veldt.

Would Rebuild Paris

More conservative, a French engineer has suggested leveling all the present buildings in the heart of Paris and replacing them with a group of enormous skyscrapers built on a cross-shaped ground plan. The upper floors he would make proof against penetration, against even two-ton bombs, by thick concrete armor, totaling perhaps sixteen feet of reinforced concrete for the top four or five floors. On beams projecting from the lower floors he would hang sheets of flexible chain armor, which would yield to the blast of explosions and yet stop splinters.

An English scheme would be similar to this, but would set all the tall buildings on pillars, leaving empty space beneath, through which explosion blasts, bomb splinters and poison gases could drive with perfect freedom but without material damage.

It is interesting to note that in all three of these schemes the skyscraper plays an essential part. If the roof is to be armored in any way, the smaller its area in proportion to the bulk of the building the better, both for military efficiency and for economy in cost of construction. Therefore a high building, concentrating many floors of industrial, business or governmental activity under one roof is preferred to a low building with the same amount of floor space under a much broader roof. Thus war or the fear of war may speed the adoption of the skyscraper, an American invention. In European cities which have thus far not been over-eager in wel-

coming this alien type of building.

But if this method of countering the air-raid menace is adopted at all, it will probably be used only for buildings housing vitally important activities. This kind of construction would be too expensive for dwelling purposes. Protection for the masses of the population must be sought by some other device.

Indeed, it may not need to be sought at all, for the natural drift of city populations toward the open land, for their own better living under peacetime conditions, happens to be about as good a thing as they could do if they were moved by military considerations alone. Airplane-borne bombs, whether gas, explosive, or incendiary, represent a high expense in both money and military effort. If you can't kill more than five or six civilians with one, better save it for a more concentrated target.

So the scattering of the civil population, aided by good motor highways and high-speed suburban rail lines, is already providing for their safety as the scattering of chickens foils the swoop of a hawk. It is only the folk who do not take to the suburbs or subsistence-farming areas, whether they be the wealthy who insist on swarming in uptown apartments to be near the bright lights or the tenement-crowded poor of the slums, who are exposing themselves as potential airplane targets.

Following American Lead

In this countryward drift, European cities are again more or less following an American lead. Americans have been glad enough to get away from city crowding, at least for living purposes, for traditionally the American urbanite is a country boy or girl who came to the big town to make good—so that going back to the country on more comfortable terms might be possible. But in European cities the scattering may have to be governmentally stimulated to some extent, because in general tight-fitted dwelling has always been the rule in them.

In any case, however, Mars appears to be playing a double role as a city planner, suggesting closer huddling under one thick shield where close-packed units are really necessary, and recommending the exact opposite, a maximum scattering of the population, wherever crowding can be dispensed with.

In lending his influence to the uncrowding of cities, Mars has ironically reversed his former style as a city planner. For centuries, war and the threat of war operated mainly in one direction—toward close crowding within a protecting wall. From the dawn of history this was so, and it was so even before there was any history, for excavations in Neolithic townsites show that the inhabitants surrounded their settlements with mud walls or palisades.

To be sure, there were a few—a very few—ancient cities that did not have walls. Sparta, in her truculent pride, boasted of her "living walls"—her fierce unconquerable citizen soldiers, who always went to meet their enemies instead of waiting for their enemies to come to them. But there was only one Sparta. An unwalled city in ancient times was as rare as an uncorseted woman in the Gay Nineties.

Thus cities wore their confining girdles of stone all through antiquity and the middle ages. Only the coming of gunpowder, that fierce fiery equalitarian leveler, put a period to the walled city as it ended the armored knight, hitherto secure in his individual personal wall of steel.

Cities indeed continued to wear their walls long after warriors ceased to wear full armor. A wall could after all be built thicker and thicker, since it did not have to be moved. So into fairly modern times the ingenuity of military engineers reared ever more massive and complicated structures of brick and stone against the heavier and heavier cannon. It took the rifled guns, high-pressure powder and high-explosive shells of the late nineteenth century to make a complete end of them.

Wall Became "Ringstrasse"

Thus Mars, city planner, laid the groundwork for the outward movement of city populations by ending one of his most ancient inventions, the confining, corseting city wall, with one of his most recent inventions, really efficient artillery. The sites of the old walls, in most European cities, are now marked by magnificent broad streets, where the wall was dumped into its surrounding ditch. Almost every German city that has an old enough history can boast its fine "Ringstrasse"—the "ring" being the line of the old encircling wall. The wall, that once hedged the burghers in, now helps them to get out.

Mars has shown activity in one other aspect of city planning, an aspect that is perhaps best known and shown in

Washington, D. C., the one capital in the world that has known no serious street rioting or fighting and was invaded by a foreign foe but once, and that in the town's very infancy.

Riot Prevention

When Major L'enfant, French army officer and architect, laid out the basic plan for the city of Washington, the riots and bitter street fighting of the French Revolution were fresh in his mind. He presented a scheme which he felt would enable the constituted authorities to cope with any insurrection in the capital: a webwork of radiating avenues, laid out over the conventional checkerboard of square-blocked streets of an American city. These wheel-spoke avenues connected at little circular parks. It was Major L'enfant's idea that a battery of artillery in each of these little circles would prevent mobs from erecting barriers in the streets, and that troops of cavalry could use these same parks as rallying-points, to sally where danger threatened.

The wheel-spoke street idea, however, was not original with Major L'enfant. Long before his time, almost two centuries before it, in fact, another Frenchman, Jacques Perret, designed what he considered an ideal town. It was surrounded by a massive wall and moat, built on a star-shaped plan, to keep off alien enemies. Within, radiating from the great central plaza where the city hall stood, were the main streets—a perfect wheel pattern. Cannon in the central plaza could hold at bay any insurrectionary mob, or any enemy troops that might break through or over the wall. At one side of the town was a citadel or ruler's castle, to which the garrison could retreat as a last stronghold if they lost everything else.

Wheel-Shaped Karlsruhe

Several of the less ancient cities of Europe show signs of Perret's influence, or at any rate of a scheme similar to his. The fine German town of Karlsruhe, founded in 1715 by the Markgraf Karl Wilhelm of Baden-Durlach,



A CITY PLANNED FOR WAR

The "ideal city" of Louis Perret, described in his book published in 1604, had wheel-spoked streets permitting quick movements of troops to threatened points on the walls, and also making it easy for cannon in the central plaza to snuff out civil insurrection.

when he got tired of an older capital, centers the original main streets in the ruler's castle in a geometrically exact plan. It is not known whether the Markgraf thought he might have to dominate his city with cannon, but the fact remains that its basic plan is quite similar to that drawn up with quite delib-

erate military intent by Perret over a hundred years before his time, and elaborated upon by the capital of the first republic in the New World a little less than a hundred years later. Truly, the hand of Mars, city planner, is seen in many strange places!

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PSYCHOLOGY

Film and Radio Audiences Puzzle British Psychologist

"WHY do so many educated people tolerate the linking of a lovely face with the accent of the gutter and the language of the garbage-can?"

This question was put by Prof. T. H. Pear, Professor of Psychology and Dean of Science Faculty at Manchester University, in delivering a paper on "Psychological Aspects of the Film and of Radio." Prof. Pear presented his paper to the Psychology Section of the International Congress of Anthropological and Ethnological Sciences in London.

"A film audience—even the most cultivated section of it—is usually tolerant of almost any crudity, cruelty or banality in the cinema," Prof. Pear said. "In ordinary life, however, these same people may be most delicately discriminative and have the highest ideals. If this is not an interesting psychological puzzle and an important sociological fact I should like to hear of one."

"Both cinema and radio represent serious, even gross, disturbances in the life of the average citizen," he contin-

ued. "This is one of the reasons that both are so important to the modern psychologist. It is idle to object that people can easily avoid having radios and can keep away from the cinema. In practice, they appear to do neither. They not only listen to radio items of a kind which they do not like, but they go on doing so—and then they write complaining letters to the broadcasting journals."

The true explanations of these facts are not yet known, Prof. Pear believes.

"The announcement that American films are to be 'morally cleaned up' involves a complicated problem for a psychologist," Prof. Pear stated. "So far as one can tell the term immoral seems here to be applied chiefly to subjects connected with sex. It would be helpful to know what the Catholic Church and the other religious sects which will follow in its wake wish to have done about the films depicting personal cruelty, sadism, dishonesty and profiteering on the next war."

Prof. Pear remarked that what the film world terms "montage"—the linking together of different situations—is in effect a defiance of time and space.

"It is interesting to notice," he said, "that every night in many minds a film story, in which montage is used, is built up and presented. It is, of course, the dream. In the dream can be traced fusion of similar situations, connected by some important mental link, fusions of words, dramatizations of abstract themes, pictorial representations of mental conflict and symbolism, where persons are made to stand for complete systems of thought. Perhaps the whole technique of the film producer may be seen in the dream."

Regarding radio, Prof. Pear remarked that the question recently raised by Dr. Hadley Cantrill, of Harvard, "Can reading or study be accomplished effectively when the radio is on?" is of sociological importance. His own experiences and those of others lead him to believe that a radio-background of pleasant, easily grasped, rhythmic but not aggressively rhythmic music is stimulating to easy mental work. He knows even mathematicians who find radio music an assistance.

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MEDICINE

Medicine More Effective When Given Through Skin

CERTAIN medicine is more effective in treating diseases of the blood vessels when induced to enter the body by the aid of an electric current than when given by mouth or by hypodermic injection under the skin, a group of New York physicians has found. These men, who recently demonstrated their method to the American Medical Association, are Drs. Irving S. Wright, A. Wilbur Duryee, Joseph Kovacs, Dean Moffat and Joseph Wiener of the New York Post-Graduate Medical School and Hospital of Columbia University.

The medicine they use has the long name of acetyl-beta-methyl choline hydrochloride. It has been found useful in treating Raynaud's disease and certain other ailments, including chronic arthritis, because it improves the local circulation.

When this medicine or similar ones are given by mouth they have little or no effect. When given by injection under the skin or into the muscles, the action is very transient because the medicine is quickly destroyed by the blood.

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When injected directly into the veins it is highly poisonous. But given by what the doctors call galvanic induction through the skin, its effects are more prolonged and hence more satisfactory, they found.

While the treatment is not a "cure" for rheumatism or chronic arthritis, it gives striking results, reducing the swelling, increasing the general activity of the joints without pain and making the patient more comfortable.

SEISMOLOGY

Better Knowledge of Earth From Better Instruments

RECENT improvements in the instruments which register earthquakes will greatly enhance our knowledge of the internal structure of the planet on which we live. These seismographs, as they are called, must be very sensitive in order to measure shocks thousands of times too weak to be felt. They must also be very reliable and always on the job, because there is no way of telling when an earthquake is to come.

The general principle of the operation of a seismometer is practically the same for all types and has been in use many years. Part of the instrument is suspended from a rigid frame attached to solid rock. The other end is free. Since the suspension is not rigid when the rock moves in an earthquake, the suspended part does not move in the same way. The relative motion between the fixed and suspended part can be detected and amplified electromagnetically just as it is in some types of telephone receivers. The current generated is measured in a galvanometer and the result recorded automatically on a sheet which also receives a record of the time. The accuracy of the time signals decides to a large extent the accuracy with which the origin of the quake can be determined.

An exceptionally accurate timing system has been developed by H. Benioff of the Seismological Laboratory in Pasadena. It depends on wireless signals given out regularly by the big broadcasting stations.

Mr. Benioff has also perfected a vertical seismograph which is so sensitive, especially to short-period shocks, that waves have been recorded after they had traveled two or three times through the

An asbestos bandage soaked in the medicine is wrapped around the affected limb or joint. Over this is placed a flexible metal plate which is connected to the positive pole of a galvanic generator. A moist pad electrode placed on the back is connected to the negative electrode and the current turned on and slowly increased. The electric current breaks the medicine down into ions which are carried into the skin.

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dense liquid core which exists in the center of the earth. Nearby quakes sometimes provide waves so short that the older instruments would not have responded at all.

The most novel and ingenious instrument which is due to Benioff is called the strain seismometer. This is simply a sixty-foot pipe attached to the earth at one end and extending horizontally to a fixed pier at the other. There is a small gap between the end of the pipe and the fixed pier. When a quake occurs the fixed foot of the pipe moves with respect to the fixed pier, and the gap changes. An electromagnetic pickup detects this change and records it amplified a million fold. Thus a quick earth movement of a hundredth of a wavelength of light will produce a half-centimeter deflection on the record.

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PHYSICS

Large Currents Produced By Lightning Strokes

WHEN lightning strikes a lightning rod or the steel mast of a high tension line, it may produce a current as high as 60,000 amperes, enough to light 130,000 fifty-watt lamps at once.

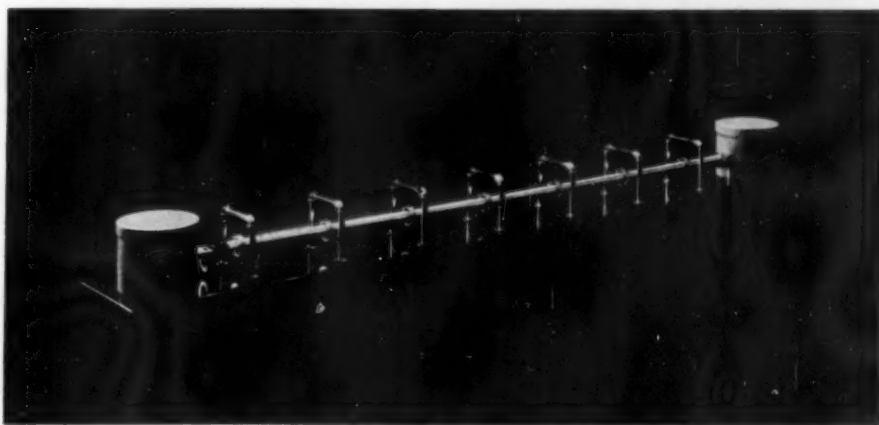
This is the result of a research carried on since 1926 by Dr. Heinrich Gruenewald and his associates of the Berlin-Charlottenburg Society for the Study of High Tension Installations.

Currents of 30,000 amperes in lightning were found to be frequent, 50,000 to occur occasionally, and 60,000 was the highest measured.

The investigation was made by inserting in the path of the lightning short rods of a special substance that becomes magnetized on the passage of a current. The degree of magnetization showed the strength of the current, and the polarity of the magnetism showed its direction. It was found that the current usually passed upward from the ground instead of downward as is commonly supposed, showing that the base of a thunder cloud is usually negatively charged. This is in accord with the results of other recent investigations.

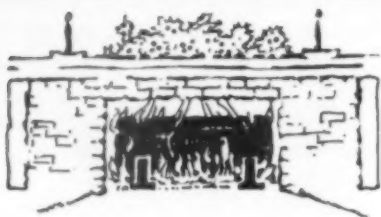
It was found also that the steel masts of high tension lines are excellent "catchers" of lightning, and are more frequently struck than is supposed. In many cases the only evidence that a mast had been struck was given by the magnetization of the special rods.

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DETECTOR OF THE EARTH'S SHUDDERS

A model of the original strain seismometer, built by Hugo Benioff who also designed the original. Two reinforced concrete piers are embedded in solid rock sixty feet apart and move only when the rock moves. The pipe shown is fixed to the pier on the right but free at the other end. During an earthquake, the pipe moves with the right pier, varying a gap on the left end and generating a current in coils on the left pier.



A Flaming Paradox

OUT OF Fire comes Water.

This statement, which at first blush looks like one of the old paradoxical riddles of the Sphinx, is quite literally true.

The ancients, classifying all things into four primal "elements," air, earth, fire and water, thought of fire and water the most completely opposite, the most antagonistic, the most incompatible, of all the four. Water quenched fire; fire, when it was the stronger, "destroyed" the water in a hiss of steam.

Yet modern chemistry shows that water is the direct product of fire in many cases—indeed in most ordinary fires that we see and use. To be sure, the theoretically "perfect" fire, resulting from the union of pure carbon and oxygen, yields the gas carbon dioxide and nothing else.

But very few of us ever get a chance to see pure carbon burning. It is hard to ignite graphite or diamond, which are about the only really pure forms of carbon at all frequently encountered. And to burn a diamond, moreover, implies a certain wanton wastefulness—a reminiscence of Cleopatra swallowing the famous wine-dissolved pearl.

Common fuels like coal, wood, oil and natural gas contain large amounts of hydrogen in addition to their carbon. With this hydrogen there may or may not be a certain amount of oxygen already bound up, but there is always less than the one-to-two ratio of oxygen to the hydrogen which expresses the chemical makeup of water. Such carbon-hydrogen compounds, with less than enough oxygen in them to satisfy the water-forming requirements, are known as "unsaturated" compounds, and the degree of their "unsaturation" is a measure of their value as fuels. For when they are burned, the hydrogen as well

as the carbon combines with oxygen, with the evolution of heat.

When the carbon combustion of such common fuels is complete, the end-product of its combination with oxygen is, of course, the same as that of the theoretically perfect pure-carbon combustion—carbon dioxide. When it is incomplete, carbon monoxide is produced as a half-way stage; but this may in its turn be burned to completion, producing carbon dioxide.

The burning of the hydrogen in these "unsaturated" gaseous, oily or tarry compounds yields the only end-product possible to such combination with oxygen. Water comes from almost all flames even more inevitably than

smoke. In fact, from a really good flame of ordinary fuel you should get no smoke, but you are bound to get water. That is why the air in an unventilated room heated by a gas grate soon becomes "heavy" and "steamy."

A flame of pure hydrogen-and-oxygen, producing nothing but water, is much easier to obtain than a flame of pure carbon-and-oxygen, producing nothing but carbon dioxide. Such a flame is one of the commonest of modern industrial tools—the flame of the oxy-hydrogen torch. The helmeted wielder of the oxy-hydrogen torch actually cuts steel rails and I-beams with a little hot water.

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PUBLIC HEALTH

Spend Less On Alcohol, Tea: More On Improving Health

SPEND a little less on alcohol, tea, coffee, tobacco and cosmetics in order to have more to spend on preventing disease and improving human health.

Try to raise the general intelligence level.

Have the courage to apply what is already known about health and disease, and to search for further knowledge along these lines.

These three pieces of advice were given to health workers of America, Canada and Mexico by Prof. Haven Emerson of Columbia University, president of the American Public Health Association, in an address before the first general session of that organization.

Self-denial, increased general intelligence and courage are the three elements needed to further improve human health, he said.

Specific problems which he urged health workers to concentrate their efforts on are sanitation, diabetes, alcohol, industrial diseases, syphilis, and sex and marriage education including birth control.

Referring to the modern frankness of mind, act and speech, he urged that health officers attack the matter of sanitation with equal frankness of spirit and of language. We can not consider ourselves a civilized nation until every place of human habitation is equipped with the means for sanitary disposal

of human waste with its infesting and infecting organisms of disease, he pointed out.

The problem of checking the increase in diabetes must be met by teaching people to exercise the large muscles of their bodies more and to limit their intake of food, he believes. He sees the increase of this disease as a result of the machine age which has reduced man's muscular exertion to the use of the fine muscles of eye and finger and has insured, with but slight interruptions, a superabundance of food.

Years can be added to human life expectancy, the birth of wanted children assured and large vacancies can be created in hospitals and asylums when the race is washed clean of the pollution of syphilis, he declared. This is the most prevalent of all communicable diseases and one for the prevention of which we are doing the least. Yet practical knowledge of how to combat syphilis exists to a greater degree than for any other disease, except diphtheria, malaria and hookworm infestation. The disease exists in more than a third of the rural population, both Negro and white, of some southern states.

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Government chemists announce the important commercial discovery that apples retain their original color when cut, if they are sprayed at once with pineapple juice.

First Glances at New Books

Additional Reviews
On Page 160

Paleontology

THE DINOSAURS—W. E. Swinton—*Thomas Murby, London*, 233 p., 25 pl., 15s. The English-reading world has long been waiting for just this book: a connected account of the monster reptiles that dominated the world in the Middle Ages of geologic history, smoothly written so that one likes to go on reading, not too technical yet furnishing plenty of exact information excellently illustrated with abundant plates and text cuts of both bones and restoration sculptures and drawings. An especially useful appendix is one listing all dinosaurs in British museums; it is to be hoped that in a subsequent edition the author's ambition may extend to a census of the entire dinosaur world.

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Science Teaching

SCIENCE TEACHING—George W. Hunter—*American Book Co.*, 552 p., \$2.50. Veteran teacher of biology for many years, and now lecturer in methods of education in science at Claremont Colleges, Dr. Hunter is well qualified to give advice and help to the science teacher whose career is just beginning. His knowledge of all the theoretic angles of attack on that stubborn fortress, the student's attention, is given a practical biting point by his long experience on the firing line.

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Historical Geography

AN ATLAS OF CURRENT AFFAIRS—J. F. Horrabin—*Alfred A. Knopf*, 149 p., \$1.50. Ready reference book on geographical places with emphasis on economic importance of locality. Clear maps allow one to follow geographically the course of world politics, war, revolution or other matters appearing everyday in the newspapers. Supplies background information on what, where and why is Valona in Albania or Tabriz in Persia and their counterparts throughout the world.

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Zoology

TOADS AND TOAD LIFE—Jean Rostand—*Methuen and Co., London*, 192 p., 7s. 6d. Translated from the original French by Joan Fletcher, this book tells in considerable detail but with compelling interest the story of the whole life of the toad. Although the species discussed is European, it belongs to the same genus, *Bufo*, as the most common

American toad, so that the account holds good, in the main, on this side of the Atlantic also. The discussion is complete enough to make the book valuable to teachers and students of zoology, popular enough to make it attractive to the general reader with an interest in nature.

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Comparative Anatomy

EARLY FORERUNNERS OF MAN—W. E. Le Gros Clark—*William Wood*, 296 p., \$5.00. One of the most prominent of British anatomists here makes an intensive examination of the morphology of the lower primates, with the aim of developing a tenable phylogeny for the higher members of the order, including man. He neglects nothing; minutiae of structure and position of even such details as the ossicles of the inner ear and the papillae of the tongue are critically examined and evaluated. His final phylogenetic tree stems on a tarsoid trunk, branching into Gibbon, Orang, Chimpanzee-Gorilla and Homo at about the point marked by the twig *Propliopithecus*.

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Natural History

THE NATURALIST ON THE PROWL—Frances Pitt—*Macmillan*, 137 p., \$2. An enthusiastic Englishwoman, who knows how to sit quiet while she watches birds and shy animals, and can take strikingly good photographs of them, and finally has command of an easy, smooth-flowing style when she comes to write about them, here tells of her adventures afield. She gives also some useful suggestions to those who would go out to see and snapshot for themselves.

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Engineering

THE PRINCIPLES OF HEATING AND VENTILATION—H. M. Vernon—*Longmans, Green*, 232 p., \$5.00. Excellent British discussion of the theories behind current heating and ventilating practice illustrated, as needed, by examples from engineering procedure in the field.

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Biology

HORMONES ET VITAMINES, UN ASPECT DU PROBLÈME DES QUANTITÉS INFINITÉSIMALES EN BIOLOGIE—Z. M. Bacq—*Hermann et Cie., Paris*, 29 p., 8 francs.

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Population

THE TWILIGHT OF PARENTHOOD—Enid Charles—*Norton*, 226 p., \$2.50. Malthusian "nightmares of population" are here replaced by a glimpse of a future world in which peoples are reduced in number at a rate unbelievable today. If the present low net reproduction rate in England continues to decline, Dr. Charles foresees a population soon halving itself with each succeeding generation. Causes are discussed and remedies suggested.

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Unnatural History

THE CASE FOR THE SEA-SERPENT—R. T. Gould—*Putnam*, 291 p., \$2.50. This book produces an abundance of quite convincing evidence, if not for the actual existence of sea-serpents, then at least in support of the ancient saying, "They that go down to the sea in ships . . . they shall behold strange wonders." The author, a retired Lieutenant-Commander in His Majesty's Navy, has brought together, literally out of all the seven seas, detailed accounts of monsters seen and believed in by sailors (and possibly by the Marines, too). He inclines to the opinion that the sea serpent may be a creature more or less resembling a plesiosaur.

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Biology

LA CELLULE GERMINALE DANS LE DYNAMISME DE L'ONTOGENÈSE—Vera Dantchakoff—*Hermann et Cie., Paris*, 87 p., 18 francs.

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Science

THIS CHANGING WORLD—S. R. Powers, Elsie F. Neuner, and H. B. Bruner—*Ginn*, 561 p., \$1.40. Science textbook for students in the seventh, eighth and ninth grades.

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Biology

LIVING THINGS—Walling Corwin and Mae Johnson Corwin—*Blakiston's*, 681 p., \$1.68. A text in general biology, designed for high school use.

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Mineralogy

FIELD TEST FOR THE COMMON METALS—George R. Fansett—*Ariz. Bur. Mines*, 56 p. Free. Sixth edition of a bulletin that is used as a text in the bureau's extension lectures on prospector's mineralogy.

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●First Glances at New Books

Additional Reviews
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Ethnology—Exploration

WHITE INDIANS OF DARIEN—Richard O. Marsh—*Putnam*, 276 p., \$3. Unknown Panama is the scene of this highly interesting adventure narrative. East of the familiar Canal Zone, in the hidden interior of Darien, Mr. Marsh and his associates found an unknown valley, and among the San Blas Indians several hundred white Indians with golden hair and eyes "green to brown." Because of their scientific importance, and in the hope of arousing sympathy for the San Blas Indians in their serious troubles with the Panamanian government, Mr. Marsh brought three white Indian children back to the United States, where the "battle of the scientists" to account for white Indians began. The book closes with a plea for active continued American supervision over the Darien Indian situation, since the treaty signed by Panamanians and Indians is not, he declares, being lived up to by Panama.

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Botany

ECONOMIC PLANTS—Ernest Elwood Stanford—*Appleton-Century*, 571 p., \$4.50. Woods, textiles, gums and resins, food, drugs, all plant products that civilized man draws on for his multiplied needs, are here passed in rapid review.

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Scientific Fiction

BEFORE THE DAWN—John Taine—*Williams and Wilkins*, 247 p., \$2. A tale of the discovery by engineers of a method whereby light-records stored in such things as calcite crystals, fossil footprints and petrified plant remains can be unravelled as television pictures of millions of years ago. Paleontologists use the device to obtain a first-hand view of events in the last days of the dinosaurs, and in particular of the life, deeds and death of a favorite carnivorous saurian named Belshazzar. Dramatic, crowded with swift scenes of wild wonders, adventure and thundering big fights, this book will be fascinating to boys of from fifteen years up to about six times that age.

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Ichthyology

TROPICAL FISH AND THEIR CARE—Norbert Lederer—*Knopf*, 229 p., \$2.50. Whether you are just beginning to think of getting your first pair of guppies, or are a seasoned veteran of

ichthyoculture with the whole house littered with aquaria full of swimming bits of rainbow, this book will be of use. It tells what equipment to get, how to tend your fish in health and in sickness, and finally gives terse, well-illustrated descriptions of all the better known and many of the less known varieties.

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Cosmetics

MODERN COSMETICS—Francis Chilson—*Drug and Cosmetic Industry*, 396 p., \$6. People of both sexes are paying much more attention to their appearance than they used to, so that mention of cosmetics is no longer merely a standard stock joke at the expense of feminine vanity. The industry has become an important one from the economic angle alone, and beauty shops begin to outnumber barber shops. For these reasons such a book as Mr. Chilson's is timely, giving as it does standard formulae for the preparation of all kinds of toilet aids and discussing details of their handling and use.

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Geophysics

TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION, FIFTEENTH ANNUAL MEETING, 1934—*National Research Council*, 2 v., 633 p., \$2.75. Bound copies of the papers read before the recent meeting of the AGU held in Washington and Berkeley.

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Archaeology

NEW LIGHT ON THE MOST ANCIENT EAST—V. Gordon Childe—*Appleton-Century*, 327 p., 32 pl., \$4.00. Most readers are aware that European civilization must trace its most important beginnings to discoveries and inventions in ancient Egypt, Mesopotamia, and other regions of the Near East. What progress Orientalists have made in tracing these beginnings is not so generally understood, since discoveries, constantly occurring, constantly tend to broaden and change the picture. The significance of recent discoveries is expertly explained in this book for those who are not Orientalists.

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Agriculture

RESHAPING AGRICULTURE—O. W. Willcox—*Norton*, 157 p., \$2. The author advances the thesis—and brings up impressive-looking battalions of figures to support it—that we are on the threshold of an Agricultural Revolution as great or greater than the Industrial Revolution that overturned the world during the nineteenth century. A fraction of the land could even now support all the people, he declares, if the best techniques and crop varieties available were intelligently used; and the end is nowhere in sight. He sees the Malthusian ghost banished into an infinitely remote exterior darkness, an abundance economy thrusting aside the present artificial price-and-profit-based scarcity economy, and an inevitable thorough-going State regimentation of agriculture.

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Aesthetics—Ethnology

MELANESIAN DESIGN, 2 vols.—Gladys A. Reichard—*Columbia University Press*, 172 p., 151 pl., 75 figs., \$10. An analysis of art styles used by Melanesians on wood and tortoiseshell objects, which they carve with designs of great complexity and variety and often with striking beauty. The study is primarily aesthetic, rather than ethnological. Dr. Reichard states: "The rewards of objective analyses are inherent in art itself. They consist in formulating the principles underlying the art style; the definition of elements, their combination into an organic whole; attitudes toward zones and fields, toward filling of spaces; preference for regularity, symmetry, or asymmetry, or rhythmic repetition."

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Geology

GEOLOGIC STRUCTURES—Bailey Willis and Robin Willis—*McGraw-Hill*, 544 p., \$4. Third edition of one of the best known and most complete texts on dynamic and structural geology. The detail and completeness with which earth-changing forces and their effects are presented are most impressive.

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